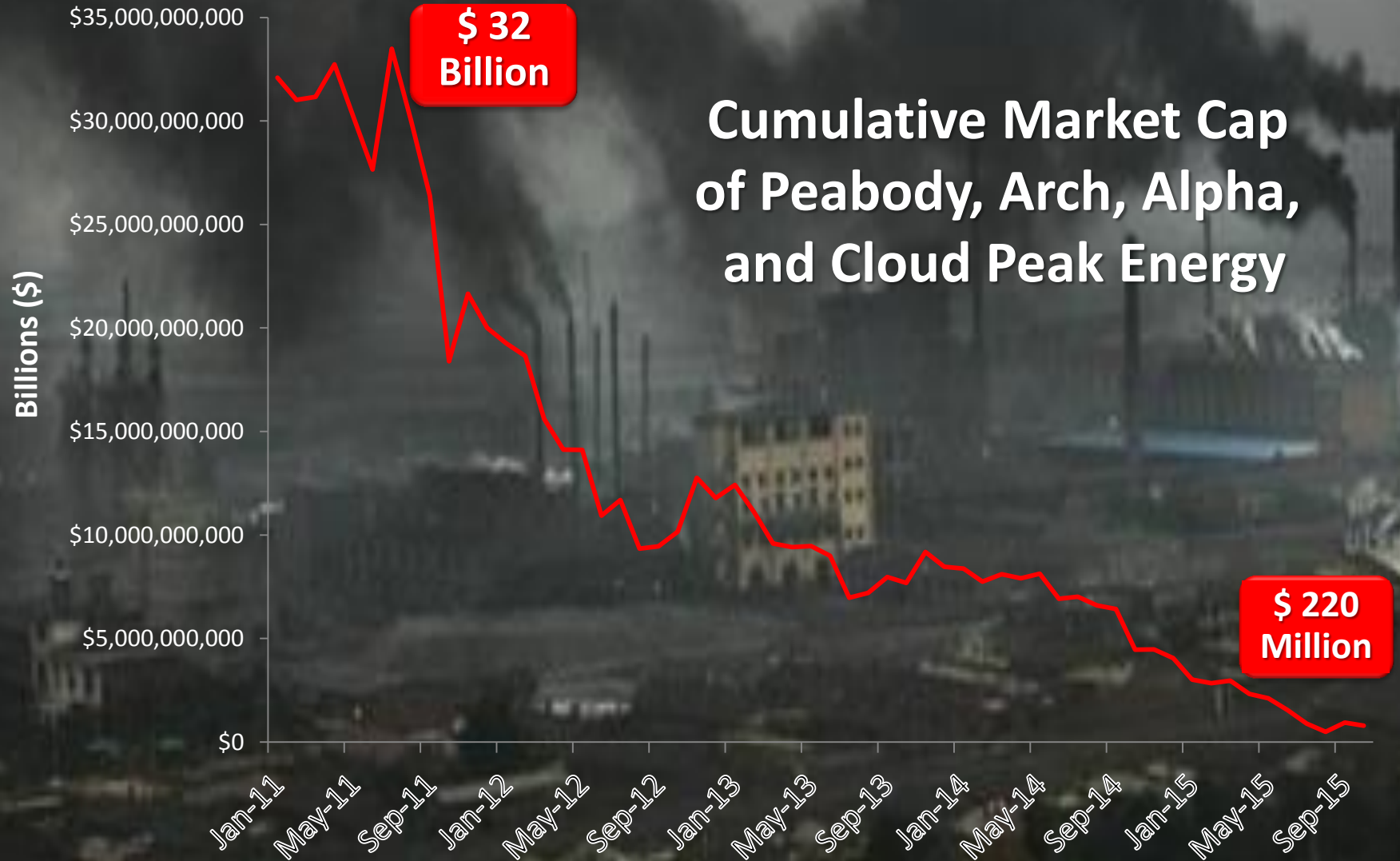


SUNRISE FROM THE WEST: THE DAWN OF THE CLEAN ENERGY ERA

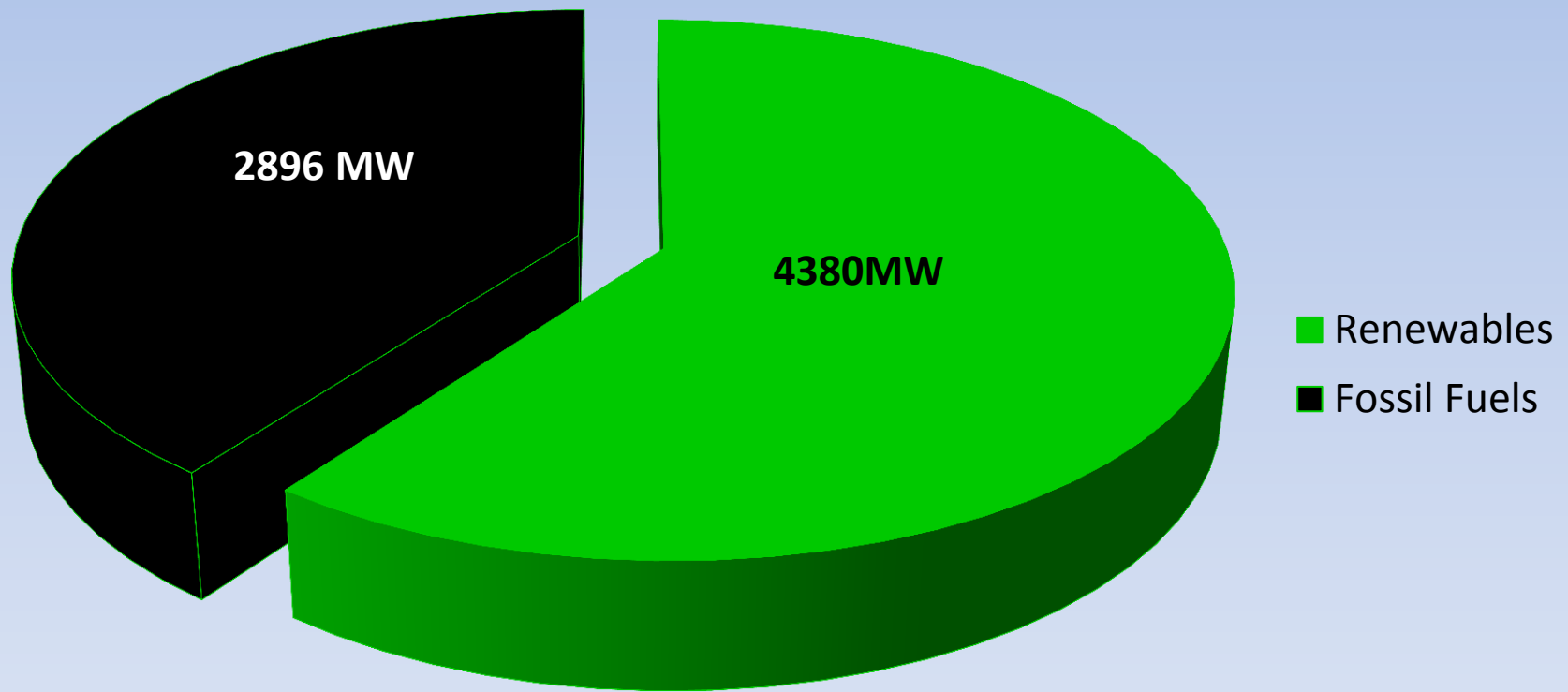


David Hochschild
Commissioner
California Energy Commission

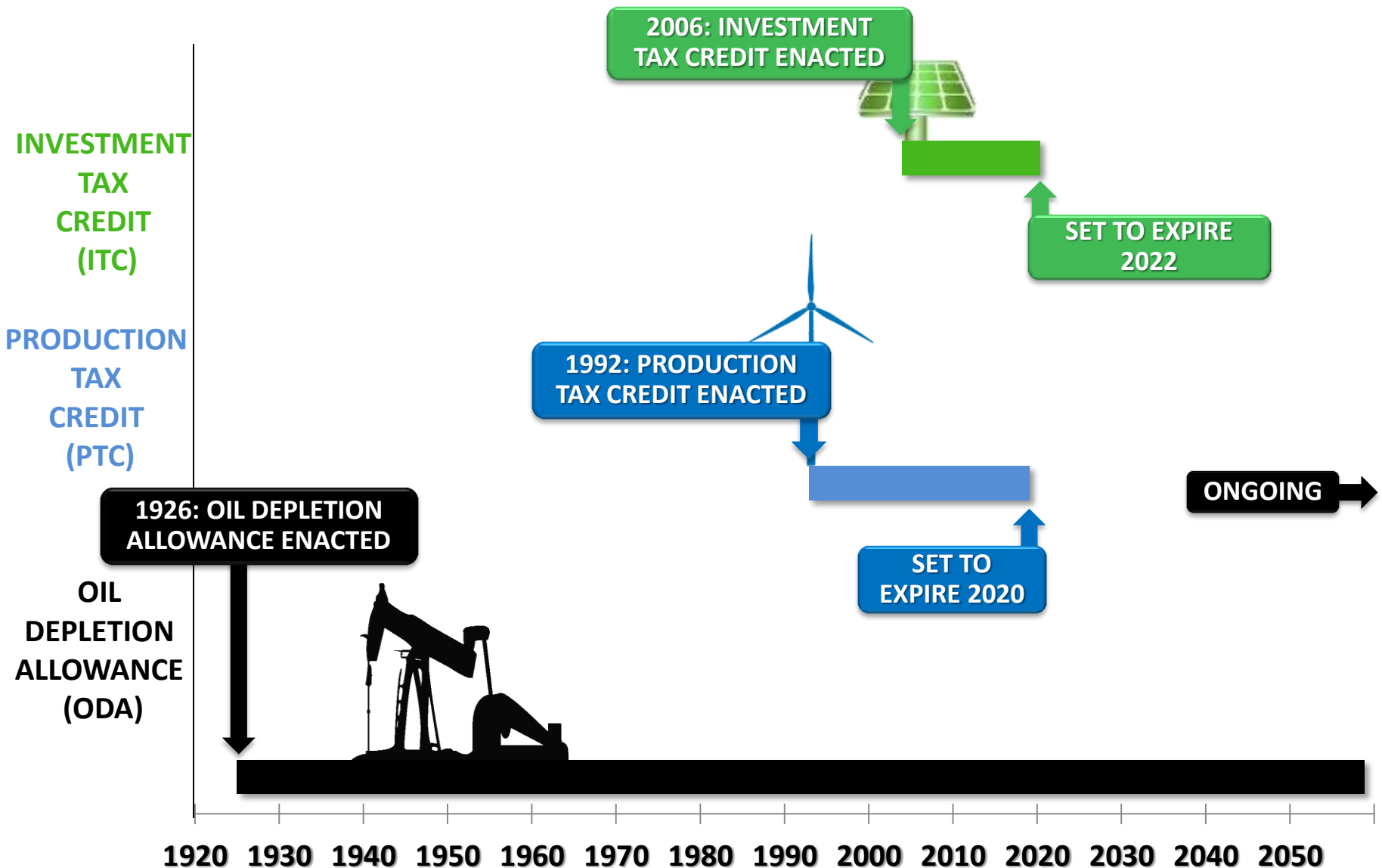
Value of Top 4 US Coal Companies Has Declined 99% Since 2011



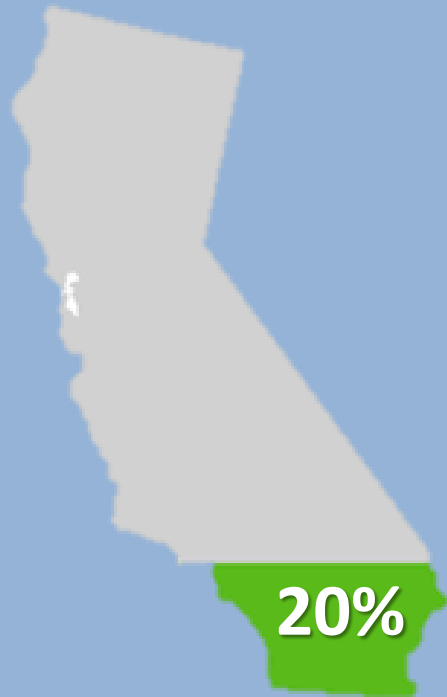
Renewable Energy Represented 60% of New Electric Generation Capacity Additions in the US in 2015



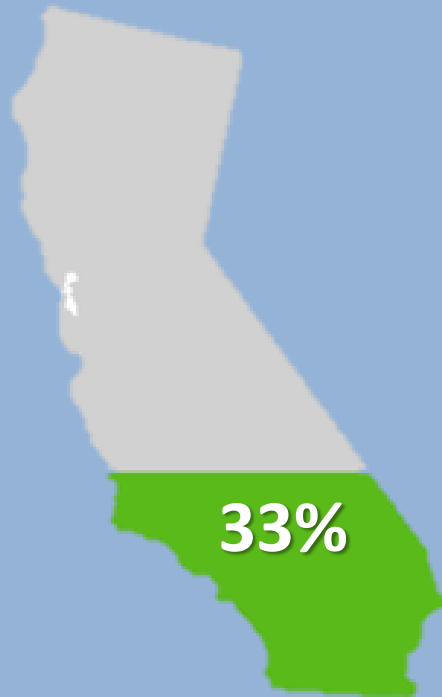
Federal Energy Subsidies



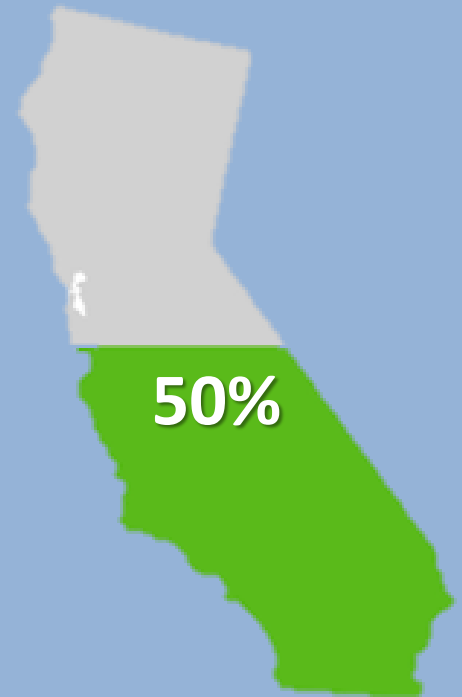
California Moves to 50% Renewables



2013

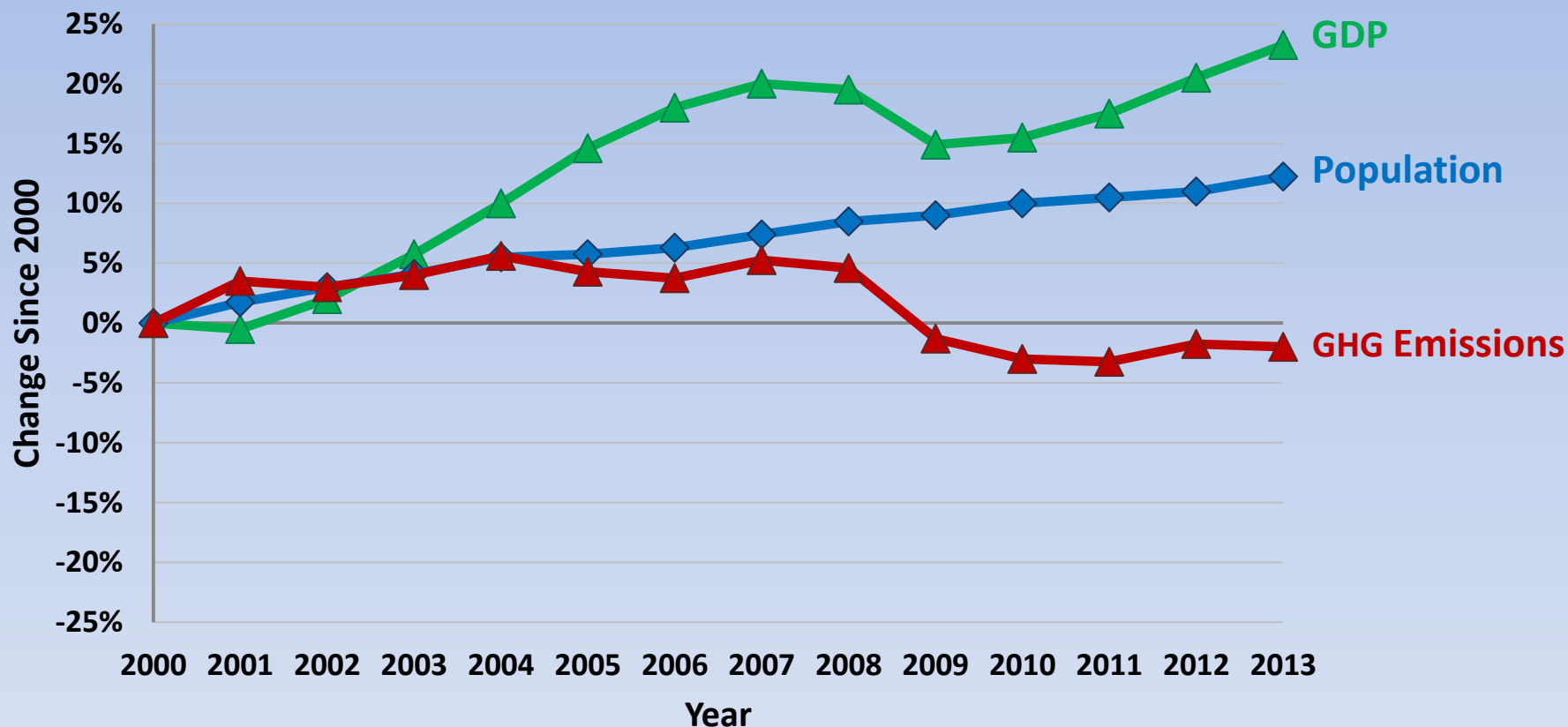


2020



2030

Change in California GDP, Population and GHG Emissions since 2000

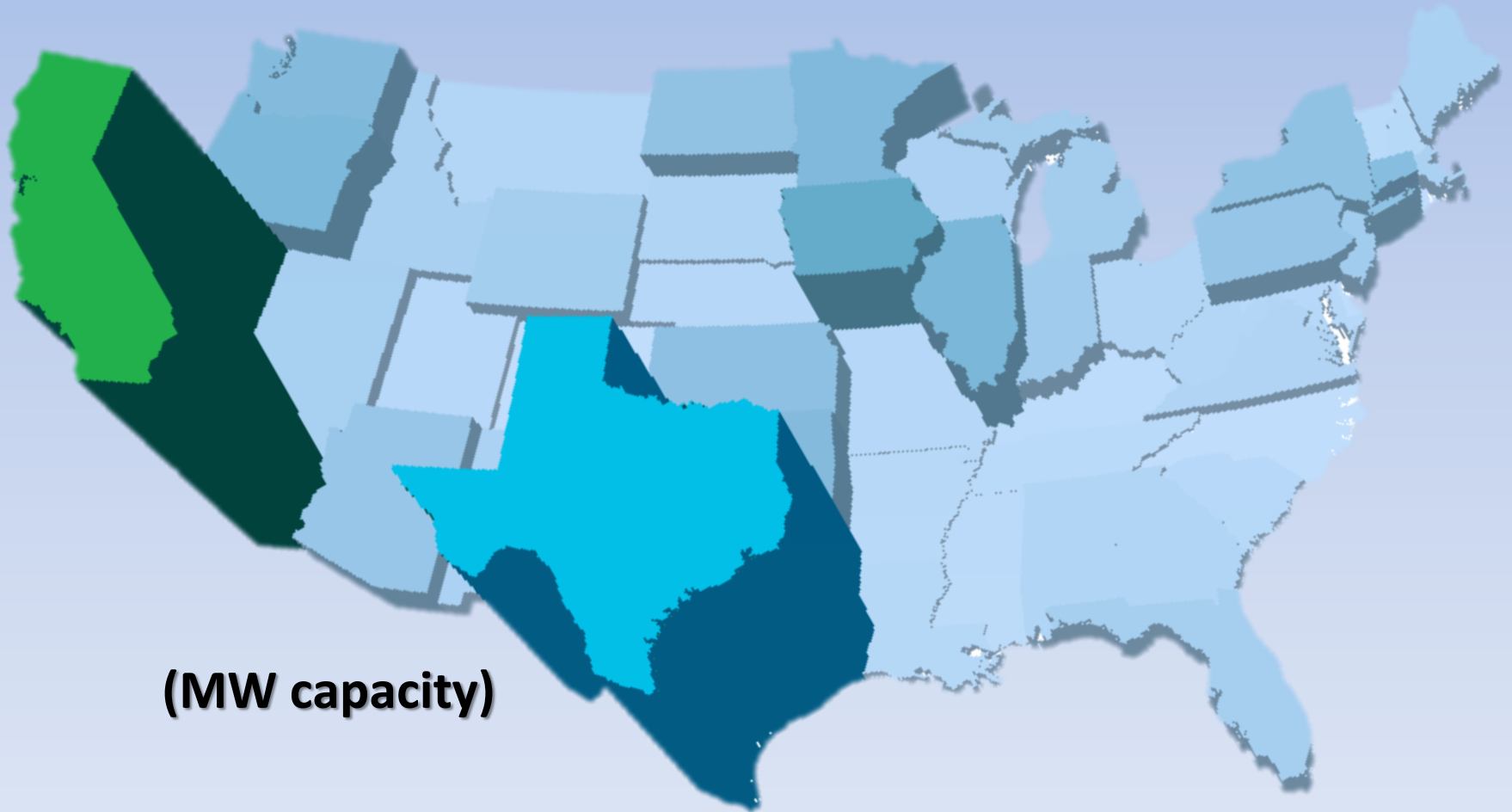


| <u>Metric</u> | <u>Associated 2013 Value</u> |
|---------------|------------------------------|
| GDP | 2.05 trillion (2009 \$) |
| Population | 38.2 million |
| GHG Emissions | 459.3 MMTCO ₂ e |

**Source: CA Air Resources Board*

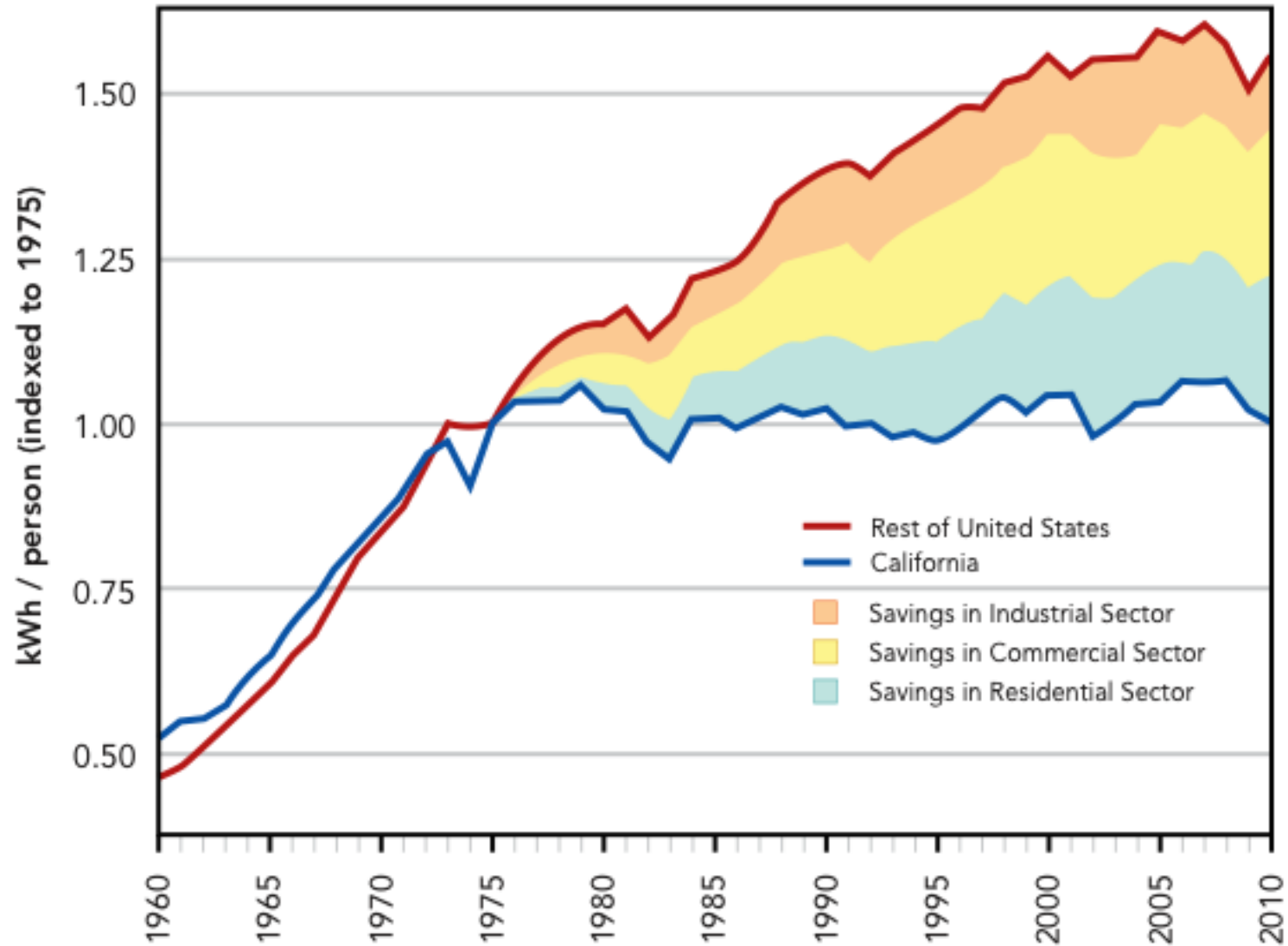
California Leads the US in Renewables Installed.

What Happens in a State With High Penetration of
Renewables & Efficiency?



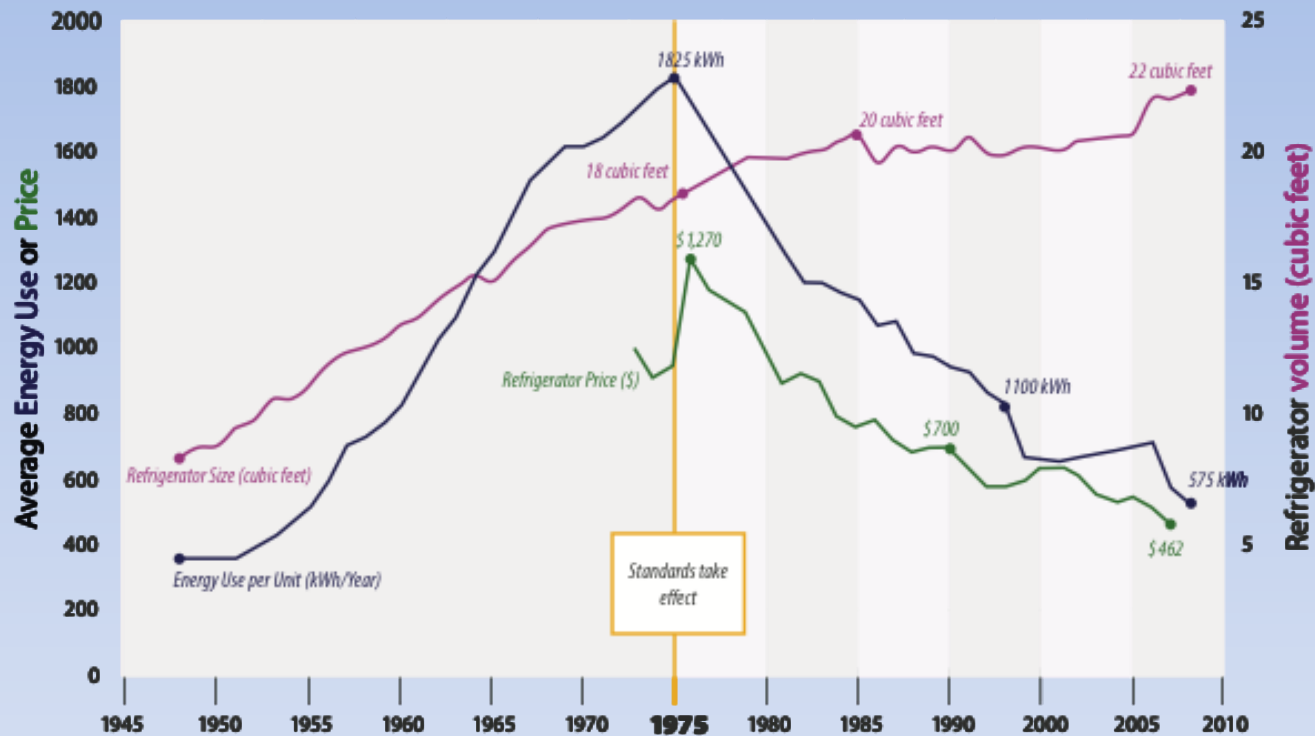
(MW capacity)

California Advancing Energy Efficiency



California Advancing Energy Efficiency

New Refrigerator Use v. Time and Retail Prices





2009: The Energy Commission's
TV efficiency standards
take effect, saving Californians
\$1 billion / year

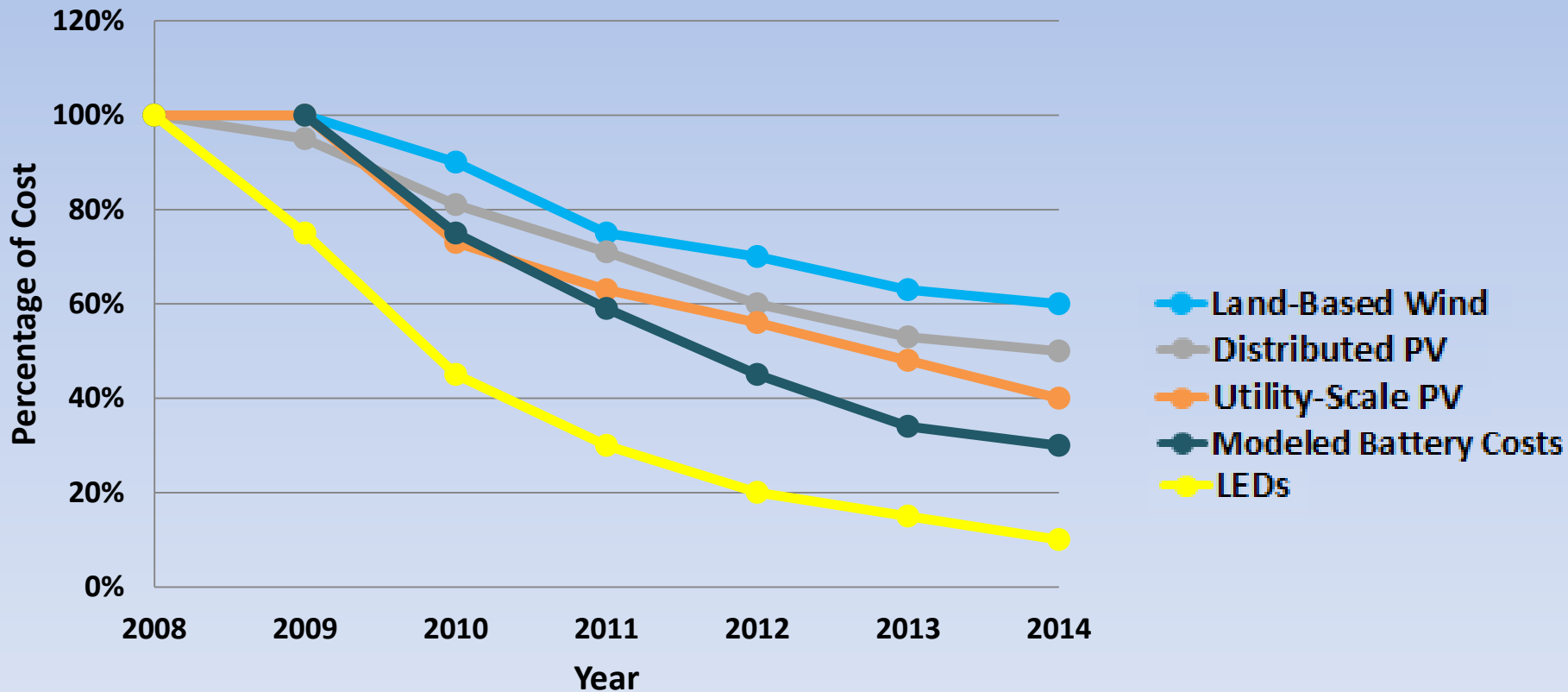
2012: The Commission's
plug-in charger

efficiency standards begin
saving Californians **\$300M / year**



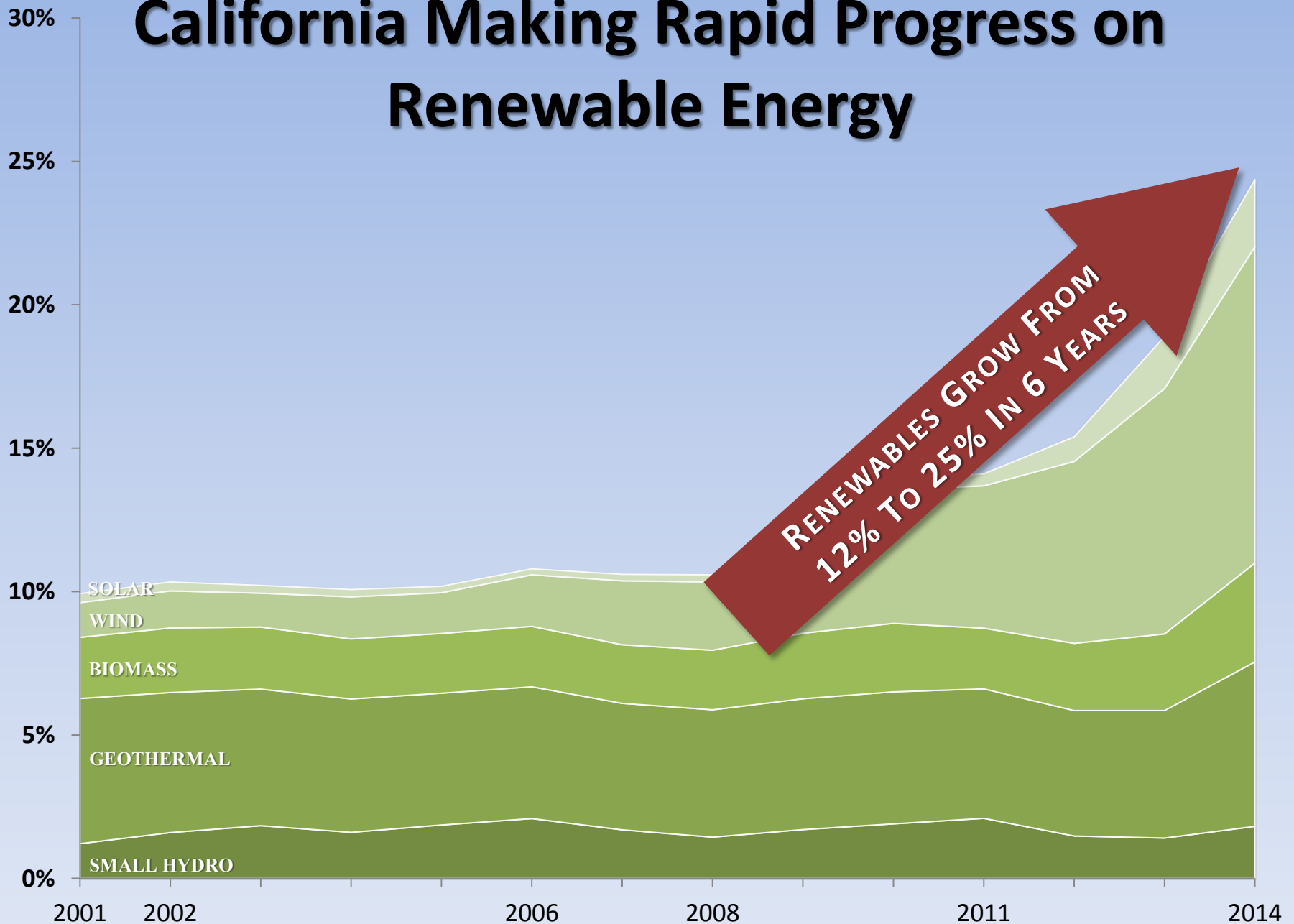
The Falling Cost of Clean Energy Technologies

Indexed Cost Reductions Since 2008



Source: DOE Report, Revolution Now,
The Future Arrives for Five Clean
Energy Technologies, 2015

California Making Rapid Progress on Renewable Energy



The World's Largest Thin Film Solar PV Project

An aerial photograph of the Desert Sunlight Solar Project in Riverside County, California. The image shows a massive, rectangular array of blue thin-film solar panels laid out in a grid pattern across a flat, arid desert landscape. The panels are arranged in long, parallel rows, with some sections appearing to be tilted or stepped. The surrounding terrain is dry and sandy, with some sparse vegetation and distant hills visible in the background. The overall scene conveys the scale and location of this large-scale renewable energy project.

**Desert Sunlight Solar
Project
550 MW
Riverside County, CA**

The World's 3rd Largest Silicon PV Project

An aerial photograph of the Solar Star Project in Kern County, California. The image shows several large, rectangular solar panel arrays arranged in a grid pattern across a vast, arid desert landscape. The panels are dark blue or black, contrasting with the light brown, sandy ground. In the background, there are some smaller structures and a road. The overall scene is a wide expanse of desert with scattered solar panels and some infrastructure.

Solar Star Project
579 MW
Kern County, CA

The World's Largest Silicon PV Project: 1.2 GW

Qing Hai Province, Western China



The World's Largest Solar Thermal Power Plant (Tower)

Ivanpah Solar Thermal Project
393 MW
San Bernardino County, CA



The World's Largest Solar Thermal Power Plant (Trough)

Solar Energy Generating System (SEGS)

354 MW

San Bernardino County, CA



The World's Largest Geothermal Power Plant

Geysers Geothermal Power Plant
955 MW
Lake County, CA



The World's Largest Wind Project

Alta Wind Energy Center
1550 MW
Kern County, CA



California Leads the Nation in Biomass Energy Generation

Honey Lake Biomass Plant
Lassen County, CA



Case Study in Reducing Impacts: Vasco Wind Energy Center Repowering

432 small turbines
removed and
replaced with
34 new turbines



Vasco Wind Energy Center, 78MW
Contra Costa County

**RESULT: Energy production tripled
& avian mortality cut by 70%**

New Solar Home Construction Growing Rapidly



**Zero Energy Community
Rocklin, CA**

27% of new homes in
Southern CA
built with solar



**Lancaster, CA: The first city in
the US to mandate solar
on new construction**

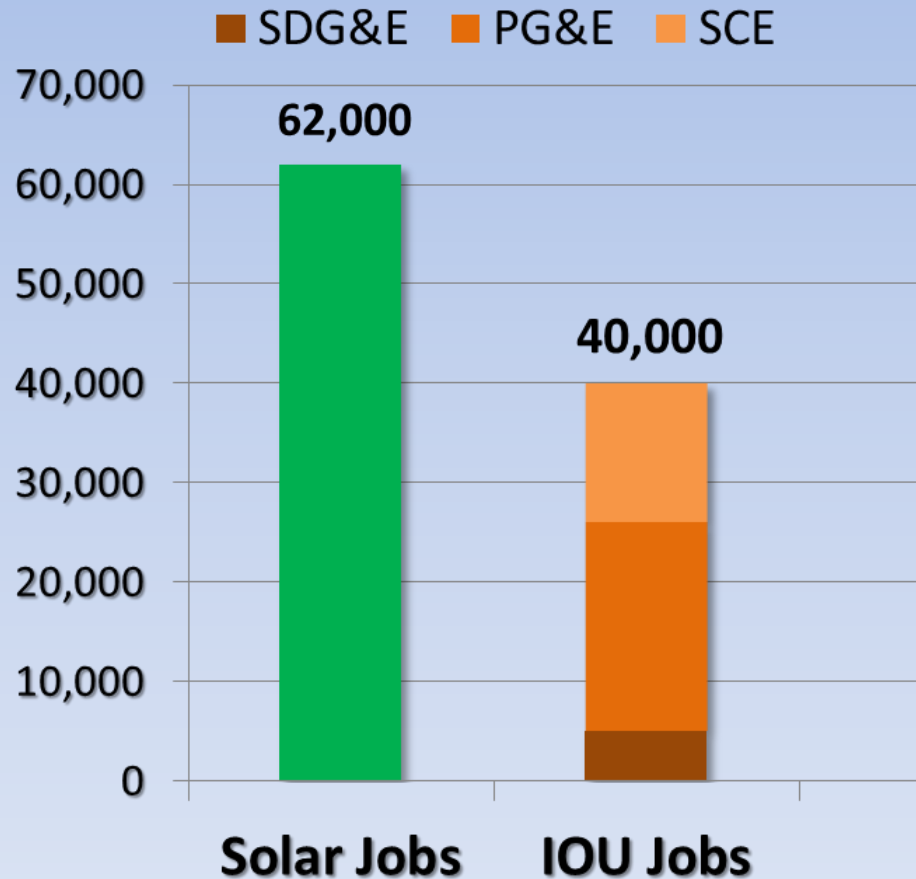


A photograph of a white 'FORECLOSURE' sign with red lettering, mounted on a white post. The sign is in the foreground, slightly tilted. In the background, a two-story house with a tiled roof and green shutters is visible. The text 'Default risks are 32% lower in energy efficient homes' is overlaid in white on the top half of the image.

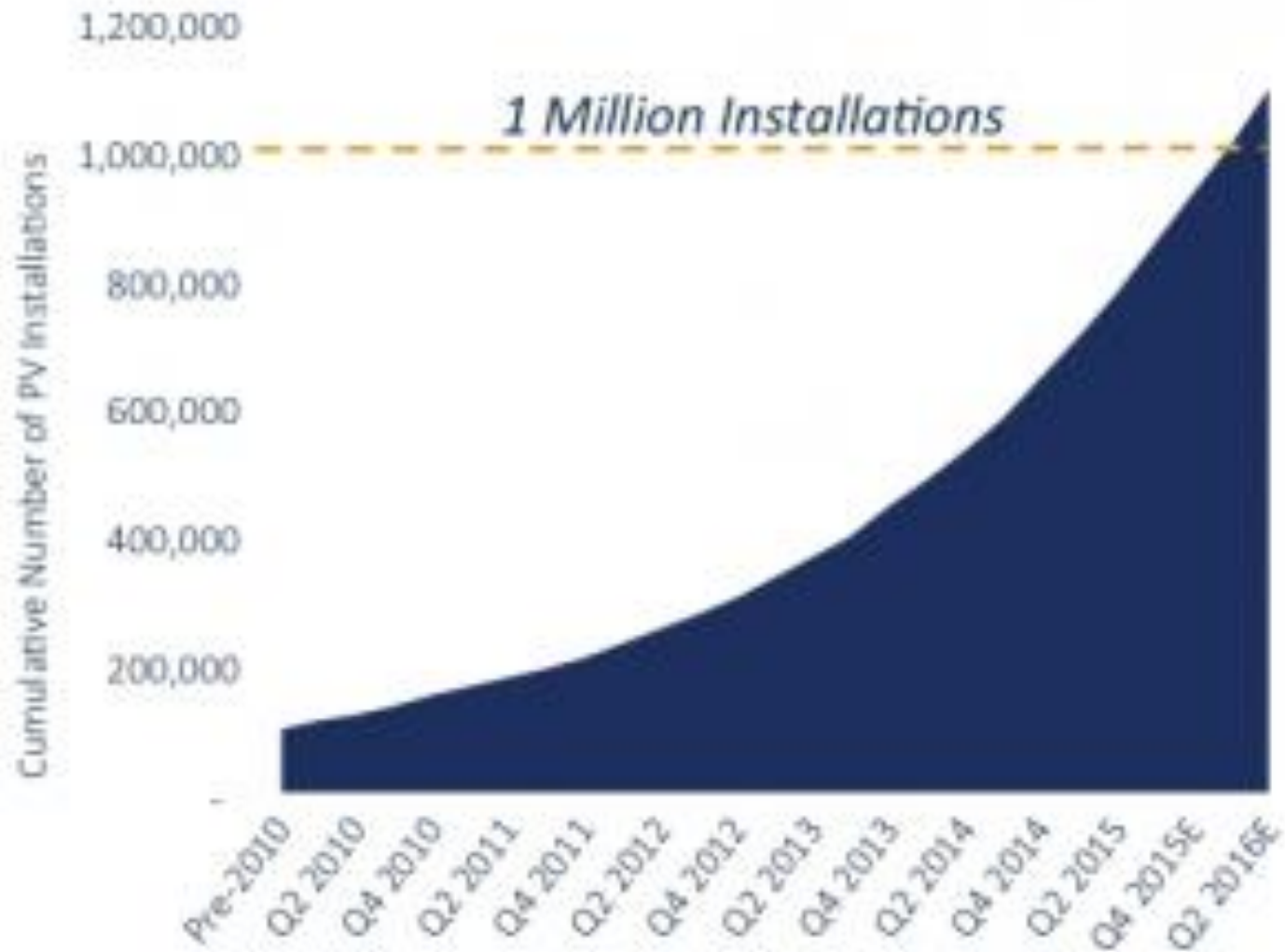
**“Default risks are 32% lower
in energy efficient homes”**

Source: *Home Energy Efficiency and Mortgage Risks Research Report*
Institute for Market Transformation, March 2013

More Solar Jobs in California Than the 3 Investor Owned Utilities Combined



US Approaches 1 Million PV systems



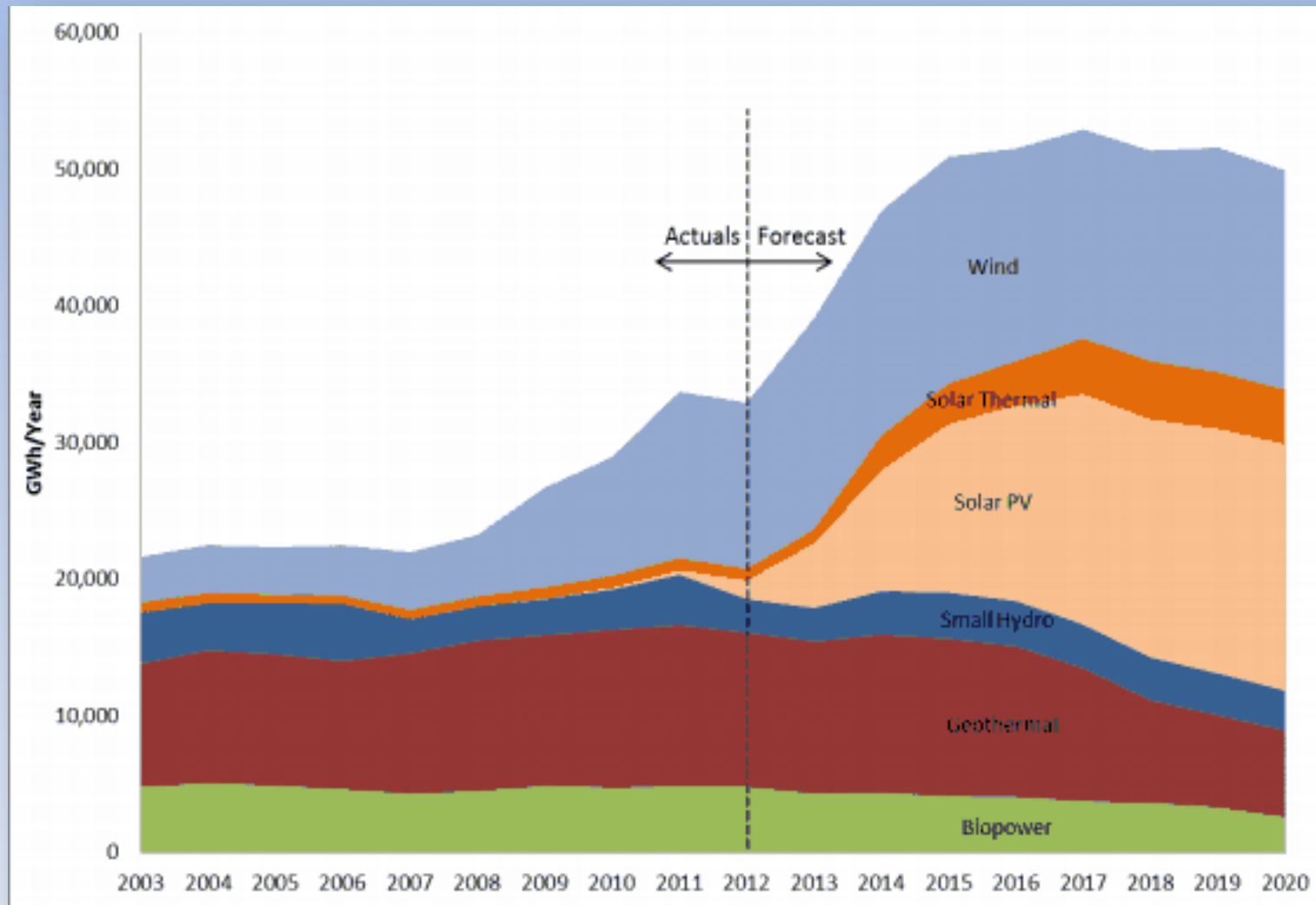
Source: GTM Research/S&P A U.S. Solar Market Insight

May 1954: Roger Bannister Breaks the 4 Minute Mile



June 2015: Solar breaks 4 cents/kwh

Solar Expected to be half of all Renewable Energy in California by 2020



Largest Manufacturing Plant in CA Produces Electric Vehicles

Tesla employs over
12,000 people

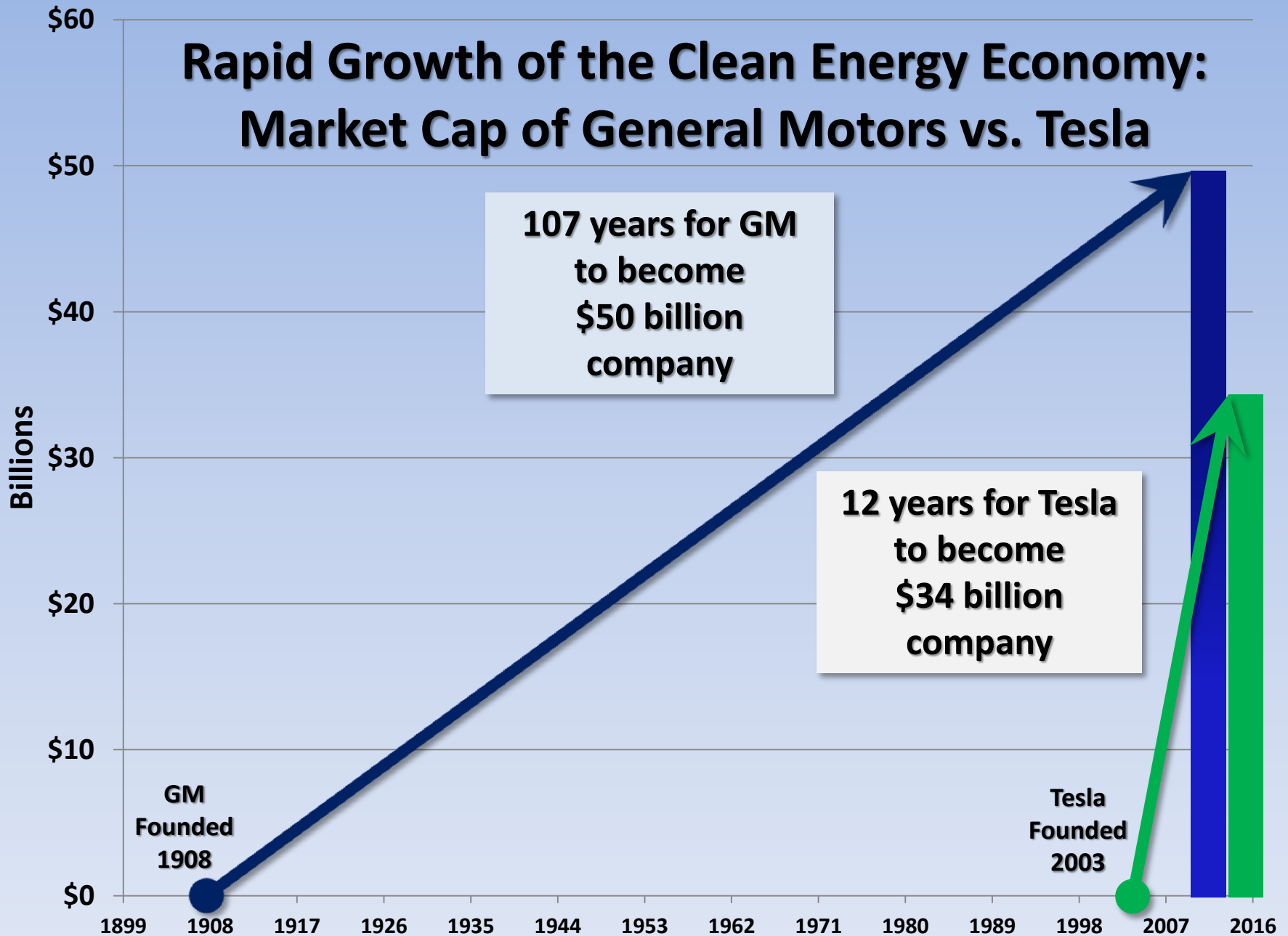


Tesla Factory
Fremont, CA



**150,000
ELECTRIC VEHICLES
IN CALIFORNIA
TODAY**

Rapid Growth of the Clean Energy Economy: Market Cap of General Motors vs. Tesla



Based on market value as of 8/5/15

Innovation in Electric Vehicles: 100 mile range, recharges in 20 minutes



Proterra Battery Electric Bus

Chevy Bolt (EV) Due Oct 2016

Retail Price: \$30,000

Range: 200 miles



Now Selling: The All-Electric Home



CityVentures all-electric homes
Bellflower, CA



Electric bike



Electric motorcycle

Companies Committing to 100% Renewable Energy

Google



The Latest Solar Customer: Solar Panels on the White House Roof



Governor Brown installs solar on the Governor's Mansion....

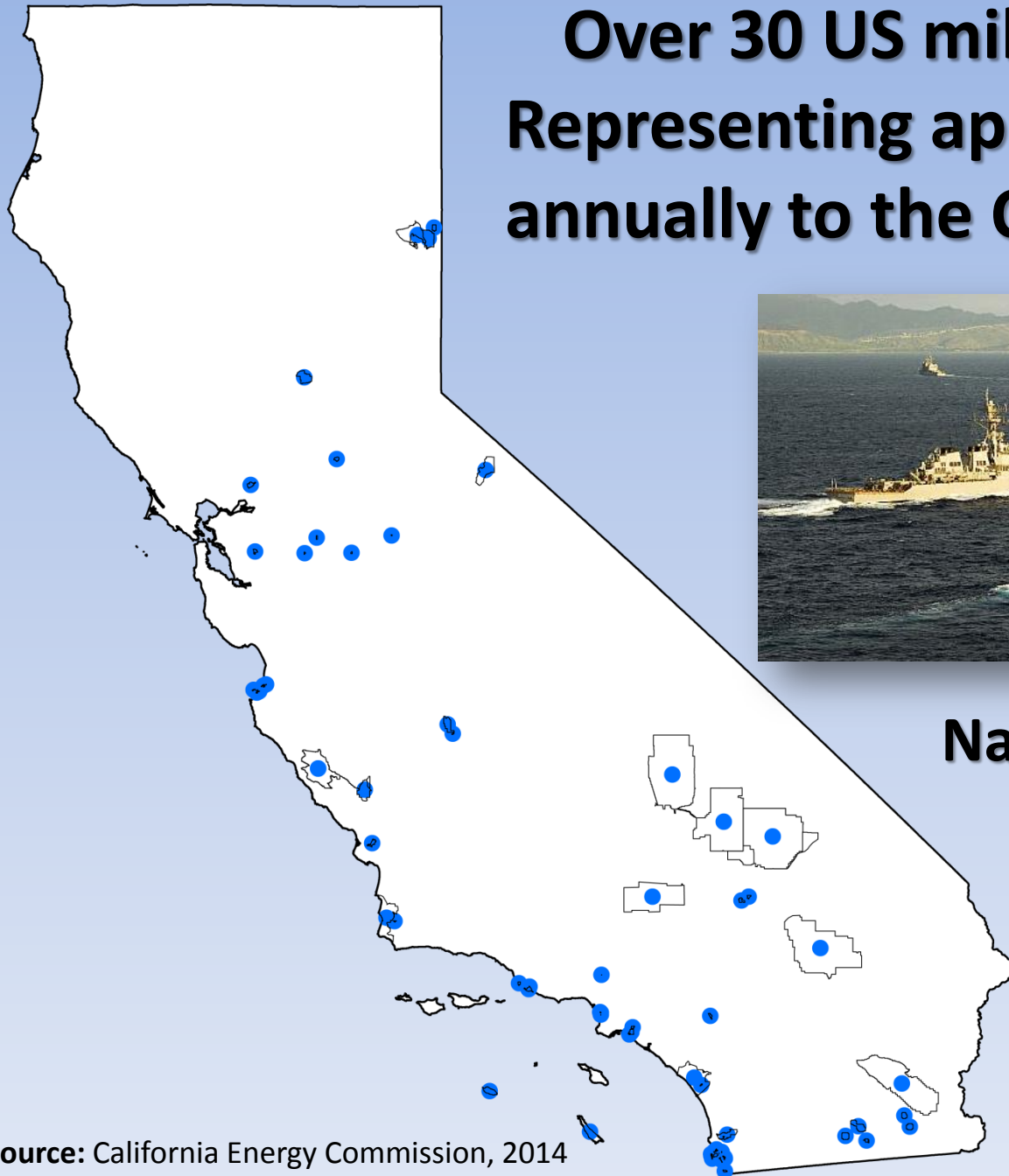


Over 30 US military bases in CA
Representing approximately \$130B
annually to the California Economy



Navy: 50% Renewables
by 2020

Marines: Zero Fossil
Fuels on Bases
by 2025



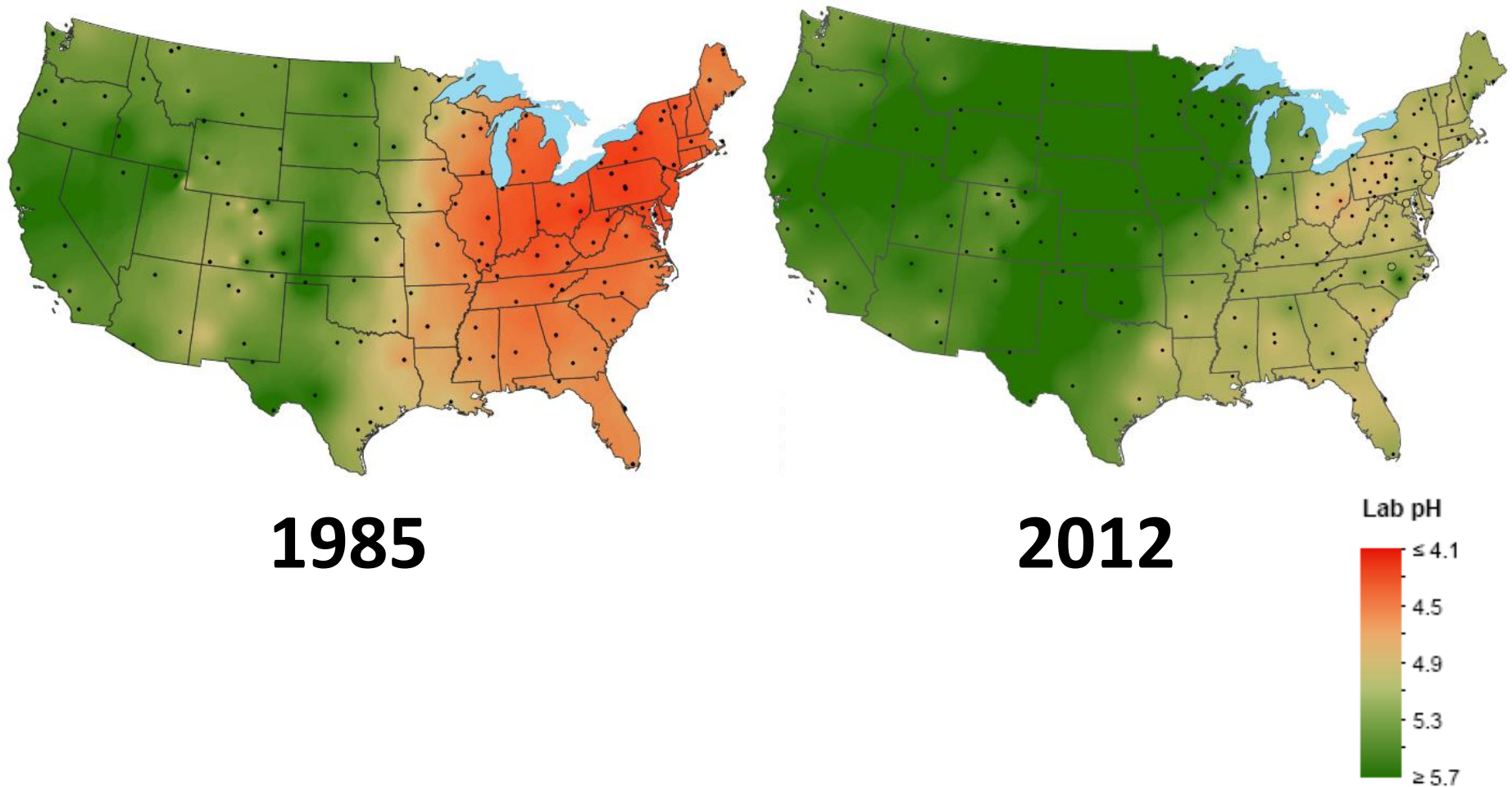
High Speed Rail is Coming to California and it will be 100% Powered by Renewables...



Drawing Lessons From Successful Campaigns: The Story of Acid Rain



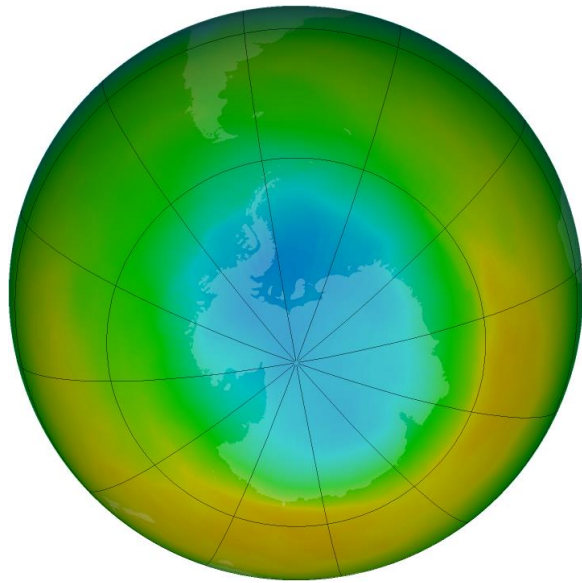
Reduction in Acid Rain



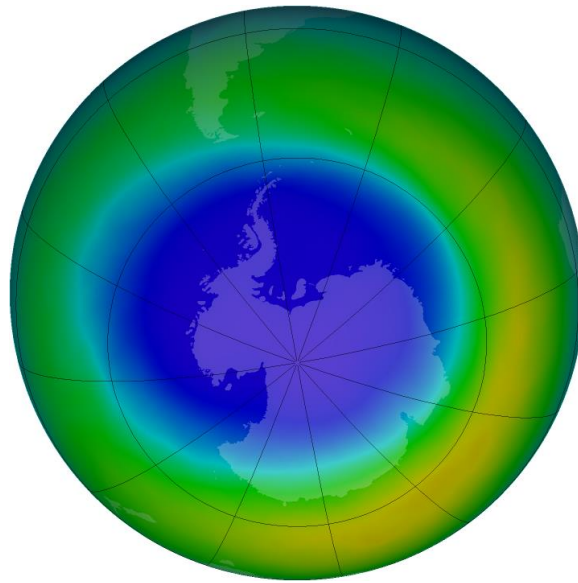
Source: National Atmospheric Deposition Program, 2014

<http://nadp.sws.uiuc.edu/ntn/annualmapsByYear.aspx>

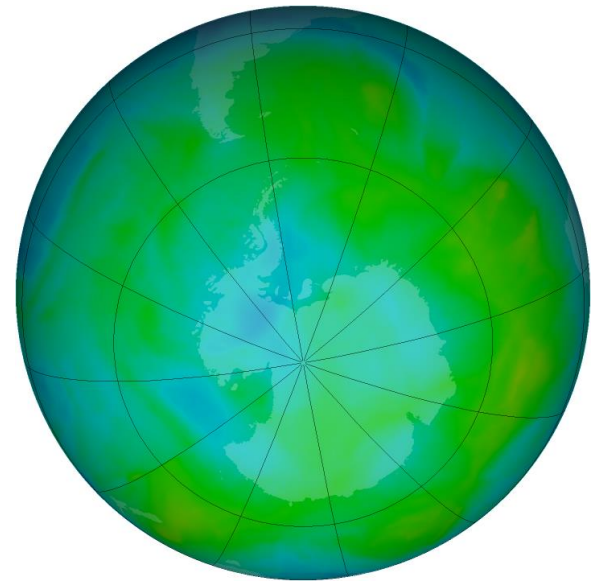
The Ozone Hole



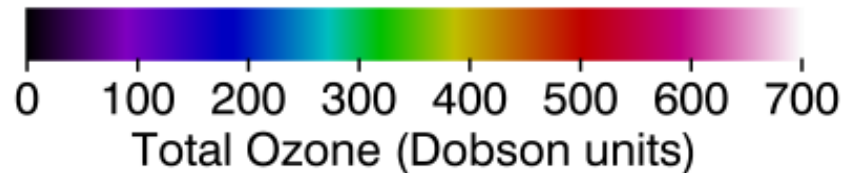
1979



2013



**2050
(expected)**



Smoking in the US




According to repeated nationwide surveys,

More Doctors Smoke **CAMELS** than any other cigarette!


Doctors in every branch of medicine were asked, "What cigarette do you smoke?" The brand named most was Camel!

You'll enjoy Camels for the same reasons so many doctors enjoy them. Camels have cool, cool *mildness*, pack after pack, and a *flavor* unmatched by any other cigarette. Make this sensible test: Smoke only Camels for 30 days and see how well Camels please your taste, how well they suit your throat as your steady smoke. You'll see how enjoyable a cigarette can be!


THE DOCTORS' CHOICE IS AMERICA'S CHOICE!




DR. MARY M. HARRIS, "M.D.",
Camel Cigarettes "most enjoyable" and "best
tasting" of all brands.




DR. WALTER F. HARRIS, "M.D.",
Camel Cigarettes "most enjoyable" and "best
tasting" of all brands.



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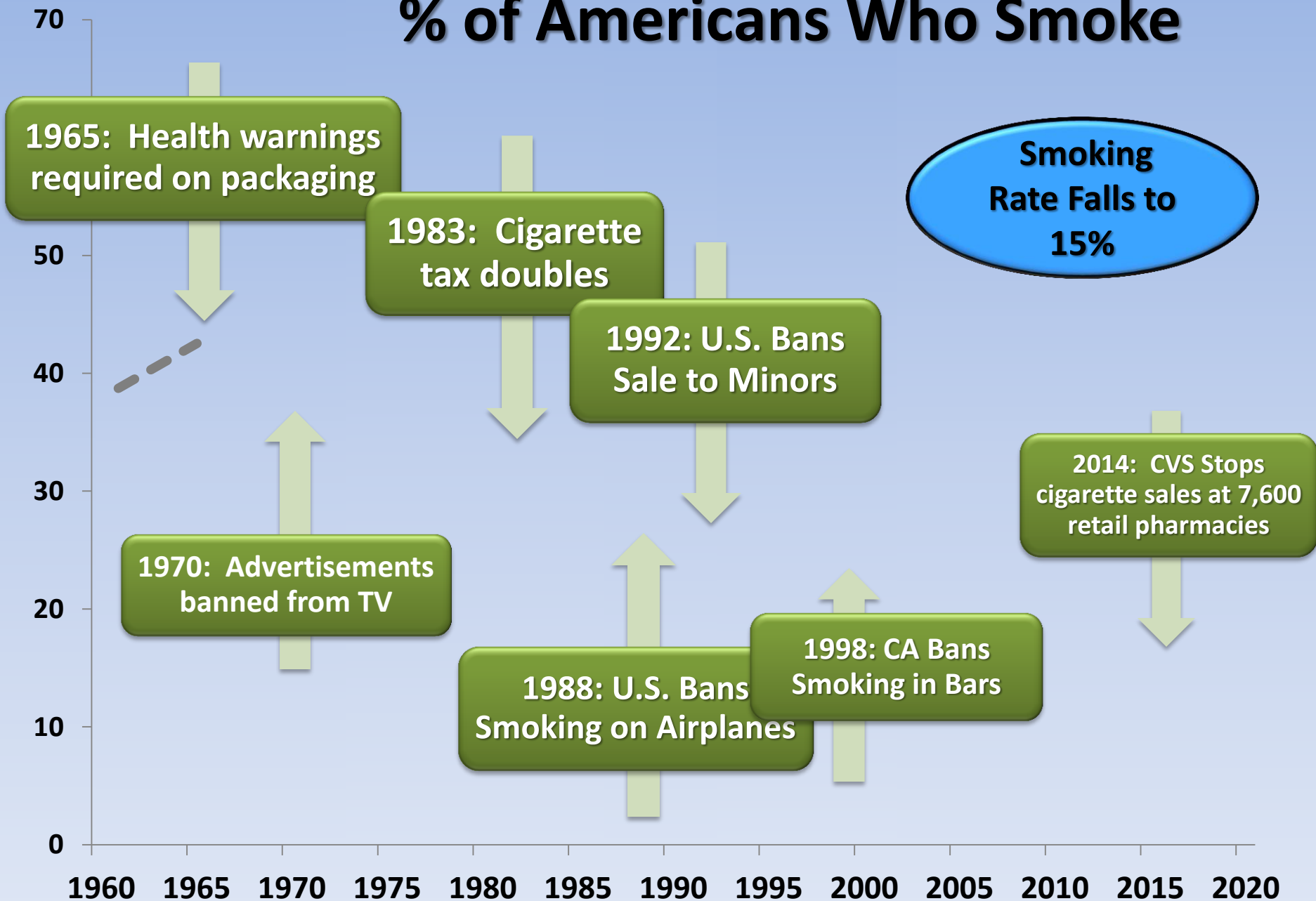


DR. MARY M. HARRIS, "M.D.",
Camel Cigarettes "most enjoyable" and "best
tasting" of all brands.

For 30 days, test Camels in your "T-Zone" (T for Throat, T for Taste).



% of Americans Who Smoke



Source: Centers for Disease Control and Prevention (CDC), 2014

http://www.cdc.gov/tobacco/data_statistics/tables/trends/cig_smoking/index.htm

Thank you



David Hochschild
California Energy Commission
David.hochschild@energy.ca.gov